Sent overnight via Fedex

Union Carbide Corporation
A Subsidiary of The Dow Chemical Company
PO Box 8361
437 MacCorkle Avenue SW
South Charleston, WV 25303
USA

October 19, 2016

Mr. William F. Durham, Director
WV Department of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304

Dear Director Durham,

Attention: Ms. Beverly McKeone
NSR Permits Program Manager

RE: Union Carbide Corporation (UCC) Institute Operations
Facility ID# 039-00005
Application for Regulation 13 Permit: Temporary Boilers

Enclosed are one hard copy and two CDs of a 45CSR13 application for the construction and operation of a three (3) 100 mmBtu/hr natural gas fired boilers. This application is submitted per Consent Order #CO-R13-E-2016-22.

A printed copy of the Class 1 Legal Advertisement to be published in a local newspaper is included with the application. When published, the affidavit of publication will be provided to your office.

Two checks in a combined amount of $2,000 is enclosed for payment of application fees in accordance with 45CSR§13-12.1.

If there are any questions regarding the attached permit application, please call me at (304) 747-3713 or via email at sizemofa2@dow.com.

Sincerely yours,

Freddie A. Sizemore

Freddie A. Sizemore
EHS Regulatory Affairs Specialist

Attachments

Union Carbide Corporation Institute Facility
Temporary Natural Gas Fired Boilers
WVDAQ Regulation 13 Permit Application

TABLE OF CONTENTS

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☐ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☒ **TEMPORARY**
☐ **CLASS II ADMINISTRATIVE UPDATE** ☒ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
Union Carbide Corporation (UCC)

2. Federal Employer ID No. ***(FEIN):***
13-142-1730

3. Name of facility *(if different from above):*
Institute Facility

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
PO Box 8361
South Charleston, WV 25303

5B. Facility's present physical address:
Route 25
Institute, Kanawha County, WV

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**

- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: The Dow Chemical Company

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: UCC is a subsidiary of The Dow Chemical Company. UCC owns and operates the facility.
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.):
Three, 100 MMBtu/hour steam generating boilers.

10. North American Industry Classification System **(NAICS)** code for the facility:
325199

11A. DAQ Plant ID No. (for existing facilities only):
039 – 00005

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R30-03900005-2012

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B.**

From Charleston, travel I-64 West toward Huntington. Take Institute exit and turn right. Proceed west approximately 0.5 miles on Route 25. UCC facility is located on the left.

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
Not Applicable	Institute	Kanawha
12.E. UTM Northing (KM): 4,248.754	12F. UTM Easting (KM): 432.189	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Three (3) temporary natural gas boilers are to be installed to provide steam to the plant while permanent boilers are being re-tubed. These boilers are to be operated under a consent agreement until such time that a temporary permit is issued.

14A. Provide the date of anticipated installation or change: September 2016 – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: October 2016

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved). Not Applicable

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day: Days Per Week: Months Per Year: see Attachment N: Supporting Emission Calculations

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known)*. A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known)*. Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) .
– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**
– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**
– For chemical processes, provide a MSDS for each compound emitted to the air. Not Applicable

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☐ Storage Tanks
☐ Grey Iron and Steel Foundry	☒ Indirect Heat Exchanger	
☐ General Emission Unit, specify:		

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify:

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ YES ☒ NO

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☒ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☐ **Responsible Official** / ☒ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE Jon W. Putnam *(Please use blue ink)* DATE: 10/19/2016 *(Please use blue ink)*

35B. Printed name of signee: Jon W. Putnam		35C. Title: WVO Responsible Care Leader
35D. E-mail: JPutnam@dow.com	36E. Phone: 304-747-1165	36F. FAX: 304-747-3147
36A. Printed name of contact person (if different from above): Freddie A. Sizemore		36B. Title: EH&S Environmental Affairs Specialist
36C. E-mail: sizemofa2@dow.com	36D. Phone: 304-747-3713	36E. FAX: 304-747-3147

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- ☒ Attachment A: Business Certificate
- ☒ Attachment B: Map(s)
- ☐ Attachment C: Installation and Start Up Schedule
- ☒ Attachment D: Regulatory Discussion
- ☒ Attachment E: Plot Plan
- ☒ Attachment F: Detailed Process Flow Diagram(s)
- ☒ Attachment G: Process Description
- ☐ Attachment H: Material Safety Data Sheets (MSDS)
- ☒ Attachment I: Emission Units Table
- ☒ Attachment J: Emission Points Data Summary Sheet
- ☒ Attachment K: Fugitive Emissions Data Summary Sheet
- ☒ Attachment L: Emissions Unit Data Sheet(s)
- ☒ Attachment M: Air Pollution Control Device Sheet(s)
- ☒ Attachment N: Supporting Emissions Calculations
- ☒ Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans
- ☒ Attachment P: Public Notice
- ☐ Attachment Q: Business Confidential Claims
- ☒ Attachment R: Authority Forms
- ☐ Attachment S: Title V Permit Revision Information
- ☒ Application Fee

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ *Forward 1 copy of the application to the Title V Permitting Group and:*
- ☐ *For Title V Administrative Amendments:*
  - ☐ *NSR permit writer should notify Title V permit writer of draft permit,*
- ☐ *For Title V Minor Modifications:*
  - ☐ *Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,*
  - ☐ *NSR permit writer should notify Title V permit writer of draft permit.*
- ☐ *For Title V Significant Modifications processed in parallel with NSR Permit revision:*
  - ☐ *NSR permit writer should notify a Title V permit writer of draft permit,*
  - ☐ *Public notice should reference both 45CSR13 and Title V permits,*
  - ☐ *EPA has 45 day review period of a draft permit.*

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

ATTACHMENT A

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE

ISSUED TO:
UNION CARBIDE CORPORATION
ROUTE 25
INSTITUTE, WV 25112-0000

BUSINESS REGISTRATION ACCOUNT NUMBER: **1007-4230**

This certificate is issued on: 07/7/2011

This certificate is issued by the West Virginia State Tax Commissioner in accordance with Chapter 11, Article 12, of the West Virginia Code.

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued.

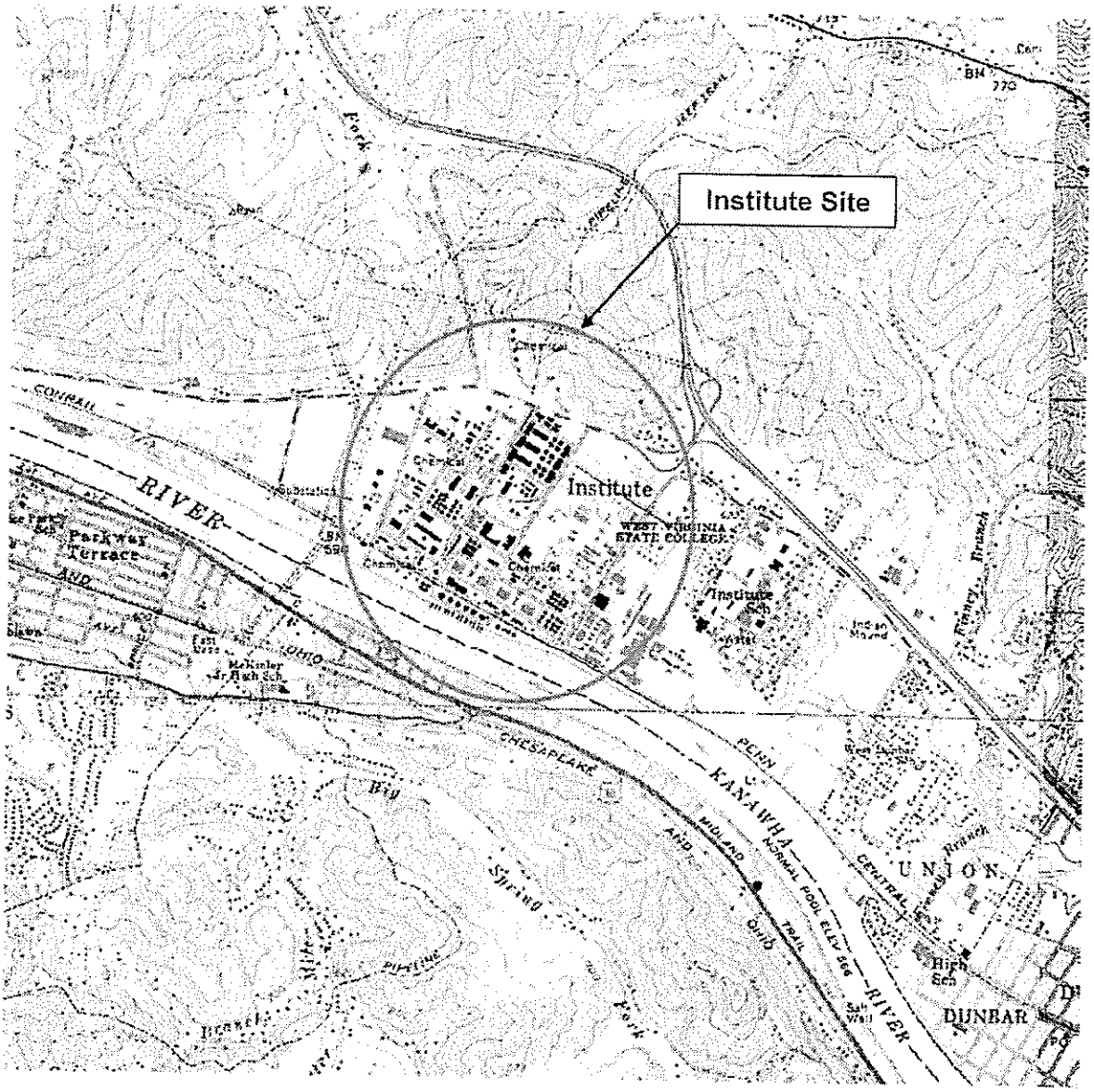
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atL006 v.4
L0004129408

Attachment B
Site Location



Attachment C

Installation and Start Up Schedule

Not applicable

ATTACHMENT D – Regulatory Discussion

Purpose: Review of Rule Applicability.

RULE/REGULATION	APPLICABLE (Yes or No)	COMMENTS
WVDAQ Rule 2	Yes	Proposed activities meet the definition of a fuel burning unit, type 'b.' Must comply with opacity standard in section 3.1 of rule. Due to using only natural gas as a fuel, these boilers are exempt from sections 8.1.a (Method 9 and particulate matter stack testing) and 8.2 (monitoring plans), per section 8.4.b.
WVDAQ Rule 4	Yes	Must prevent objectionable odors.
WVDAQ Rule 6	No	No incineration of refuse is taking place.
WVDAQ Rule 7	No	Proposed operation is not a manufacturing process.
WVDAQ Rule 10	Yes	Proposed activities meet the definition of a fuel burning unit, type 'b.' Subject to sulfur dioxide mass emission standards of section 3.2.c. Only natural gas will be used as fuel. Per section 10.3, these boilers are exempt from testing, monitoring, record keeping and reporting of section 8 of the rule.
WVDAQ Rule 13	Yes	Preconstruction permit required.
WVDAQ Rule 14	No	PSD does not apply because uncontrolled emissions are less than applicability threshold amounts. See Attachment N: Supporting Emission Calculations.
WVDAQ Rule 16	Yes	Subject boilers are covered by 40 CFR 60, Subpart Dc. However since the boiler fuel is natural gas, only an initial notification of commencement of operation per 40 CFR 60, Subpart A, General Provisions is required. Natural gas fired boilers covered by Subpart Dc are not required to file semi-annual reports.
WVDAQ Rule 17	No	Does not apply because installation and operation of boilers will not result in fugitive particulate matter emissions.
WVDAQ Rule 18	No	Requirements for Commercial and Solid Waste Incineration Units – there will be no incineration of solid waste.
WVDAQ Rule 19	No	Non-Attainment New Source Review does not apply because the source is located within an area of attainment for all pollutants.
WVDAQ Rule 21	No	This unit is not engaged in the manufacture, mixing, storage, use, or application of volatile organic compounds, therefore it is not subject to this rule.

ATTACHMENT D – Regulatory Discussion

RULE/REGULATION	APPLICABLE (Yes or No)	COMMENTS
WVDAQ Rule 22	Yes	Rule 13 application fee applies. Provided with permit application. Fee payment covers general application ($1,000) and NSPS ($1,000).
WVDAQ Rule 25	No	Proposed installation does not require a permit per WVDEP Division of Water and Waste Management Regulations
WVDAQ Rule 27	No	Boilers do not meet the definition of a chemical processing unit and are generally not subject to this rule.
WVDAQ Rule 29	Yes	Submittal of volatile organic compound emissions data. Data to be provided as part of site submittals as required by Agency rules.
WVDAQ Rule 30	Yes	Air operating permit (Title V) provisions to be addressed by separate transmittal.
WVDAQ Rule 34	No	Per CFR §63.7491(j) temporary boilers are exempt from 40 CFR 63, Subpart DDDDD provisions. The Temporary Boilers are expected to be on site for less than 12 months*
WVDAQ Rule 40	No	Maximum design heat input is less than 250 mmBtu/hr/boiler.
40 CFR 64 (CAM)	No	Compliance assurance monitoring (CAM) does not apply because this is not a modification to a large pollutant specific emission unit (PSEU).

*Per 40 CFR §63.7575

Temporary boiler means any gaseous or liquid fuel boiler or process heater that is designed to, and is capable of, being carried or moved from one location to another by means of, for example, wheels, skids, carrying handles, dollies, trailers, or platforms. A boiler or process heater is not a temporary boiler or process heater if any one of the following conditions exists:

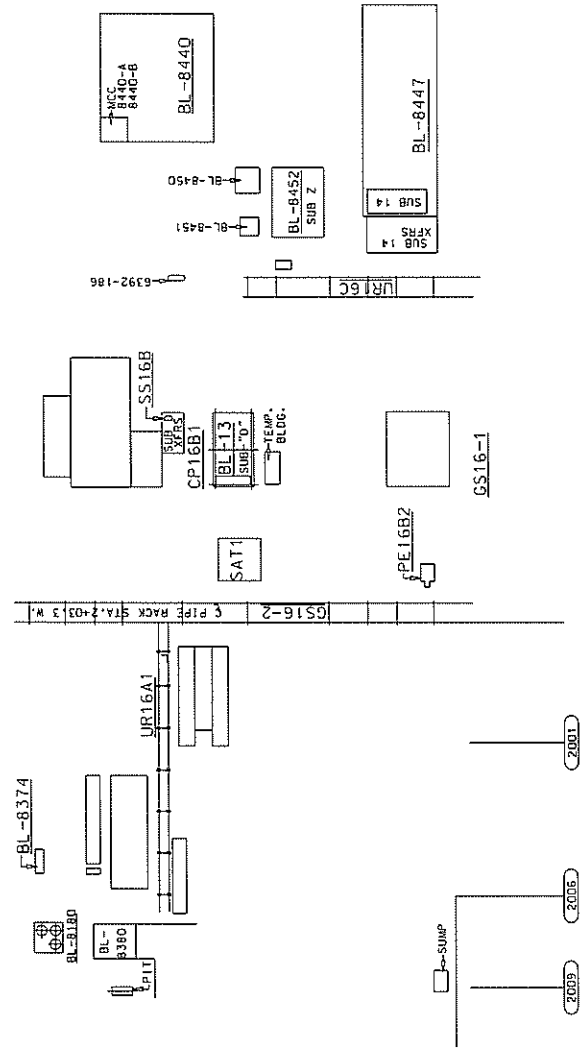
(1) The equipment is attached to a foundation.

(2) The boiler or process heater or a replacement remains at a location within the facility and performs the same or similar function for more than 12 consecutive months, unless the regulatory agency approves an extension. An extension may be granted by the regulating agency upon petition by the owner or operator of a unit specifying the basis for such a request. Any temporary boiler or process heater that replaces a temporary boiler or process heater at a location and performs the same or similar function will be included in calculating the consecutive time period.

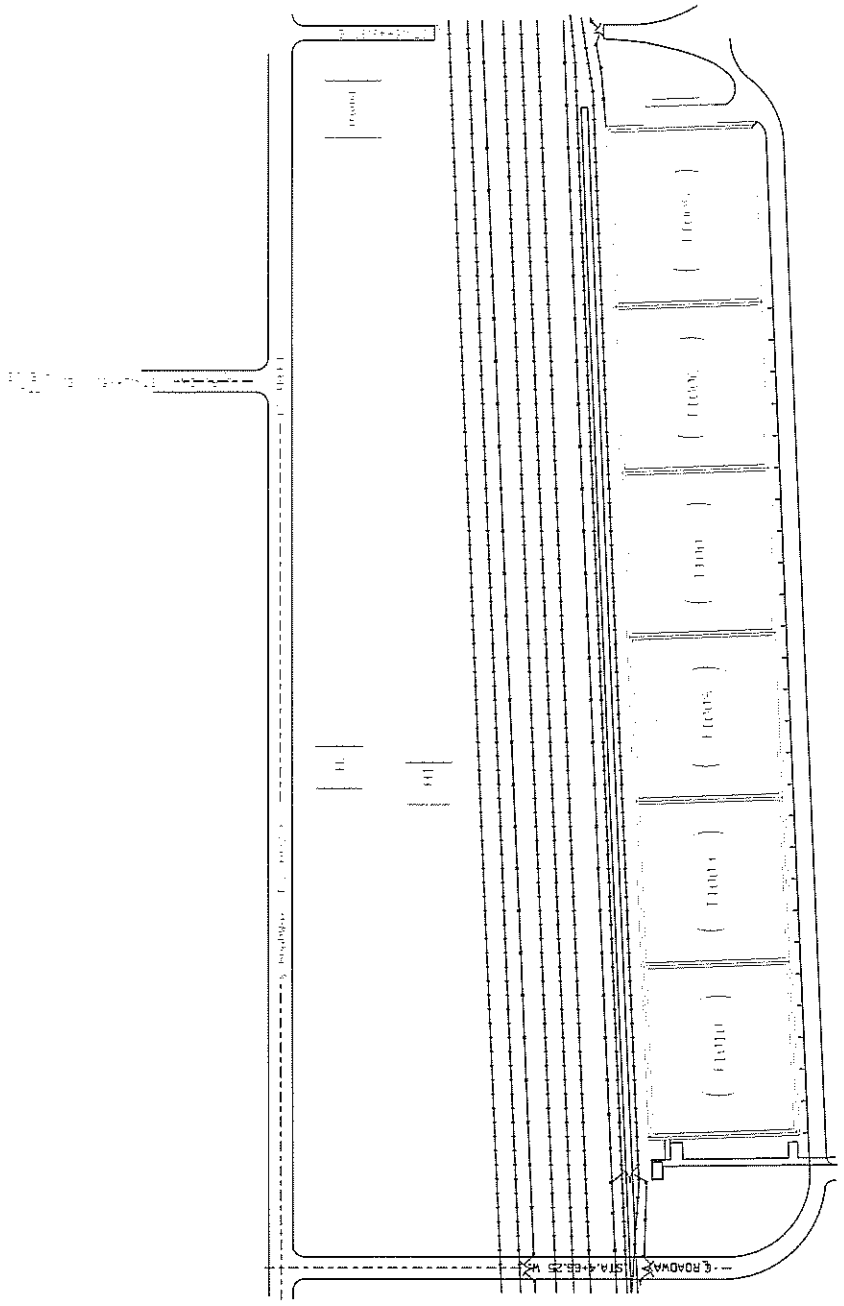
(3) The equipment is located at a seasonal facility and operates during the full annual operating period of the seasonal facility, remains at the facility for at least 2 years, and operates at that facility for at least 3 months each year.

(4) The equipment is moved from one location to another within the facility but continues to perform the same or similar function and serve the same electricity, process heat, steam, and/or hot water system in an attempt to circumvent the residence time requirements of this definition.

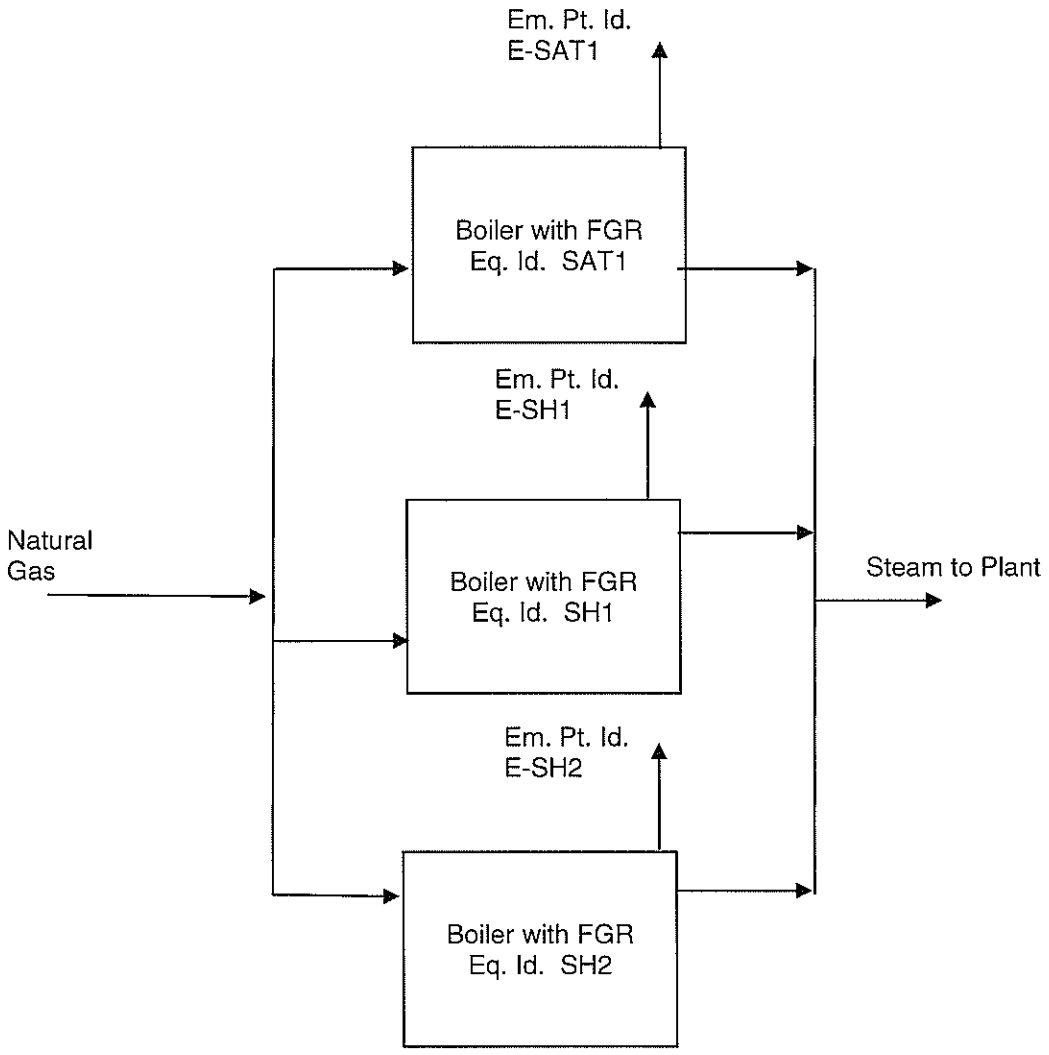
ATTACHMENT E-1



ATTACHMENT E-2



Union Carbide Corporation Institute Facility
Regulation 13 Permit Modification Application – Temporary Natural Gas Boilers
Attachment F: Process Flow Diagram



Union Carbide Corporation Institute Facility
Regulation 13 Permit Modification Application: Temporary Natural Gas Fired Boilers
(Indirect Heat Exchangers)
Attachment G: Process Description

Installation of three natural gas fired boilers is proposed. The boilers will be fueled by natural gas. The maximum design heat input of each boiler is 100 mmBtus/hr. The boilers will provide steam to operations located at the Institute site.

The boilers will be equipped with low NOx burners and flue gas recirculation for reduction of NOx emissions.

Attachment H

Material Safety Data Sheets

Not Applicable

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device [4]
SAT1	E-SAT1	Natural Gas Fired Boiler	2016	100 MMBtus/hr	New	Not Applicable
SH1	E-SH1	Natural Gas Fired Boiler	2016	100 MMBtus/hr	New	Not Applicable
SH2	E-SH2	Natural Gas Fired Boiler	2016	100 MMBtus/hr	New	Not Applicable

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table-& Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
E-SAT1	Upward Vertical Stack	SAT1	Natural Gas Fired Boiler #SAT1			C		CO NOX PM_{10} SO_2 VOC	3.69 3.64 0.62 0.06 0.54	See Section O Monitoring, Record-keeping, Reporting and Testing	Same as Uncontrolled		G/V	EE* EE* O** O** O**	
E-SH1	Upward Vertical Stack	SH1	Natural Gas Fired Boiler #SH1			C		Same as above							
E-SH2	Upward Vertical Stack	SH2	Natural Gas Fired Boiler #SH2			C		Same as above							

EE* – manufacturer's guarantee – 50 ppmv and 30 ppmv for CO and NOx, respectively – corrected to 3% oxygen.
O** - AP-42 emission factors

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data

Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
E-SAT	4.92 ft. by 6 ft.	Approx. 357	29,500	17	Approx. 594	24	±4,248.3	±431.8
E-SH1	4.92 ft. by 6 ft.	Approx. 357	29,500	17	Approx. 594	24	Same as above	Same as above
E-SH2	4.92 ft. by 6 ft.	Approx. 357	29,500	17	Approx. 594	24	Same as above	Same as above

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☐ Yes ☒ No ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☐ Yes ☒ No ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No Estimated emissions from natural gas piping provided in following section. ☐ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET. Not a chemical processing unit.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	Not Applicable					
Unpaved Haul Roads	Not Applicable					
Storage Pile Emissions	Not Applicable					
Loading/Unloading Operations	Not Applicable					
Wastewater Treatment Evaporation & Operations	Not Applicable					
Equipment Leaks	Volatile Organic Compounds	0.1	0.43	0.1	0.43	Emission Factors
General Clean-up VOC Emissions	Not Applicable					
Other	Not Applicable					

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, etc. DO NOT LIST CO_2, H_2, H_2O, N_2, O_2, and Noble Gases.
[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	Not Applicable					
Unpaved Haul Roads	Not Applicable					
Storage Pile Emissions	Not Applicable					
Loading/Unloading Operations	Not Applicable					
Wastewater Treatment Evaporation & Operations	Not Applicable					
Equipment Leaks	Volatile Organic Compounds	0.1	0.43	0.1	0.43	Emission Factors
General Clean-up VOC Emissions	Not Applicable					
Other	Not Applicable					

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, etc. DO NOT LIST CO_2, H_2, H_2O, N_2, O_2, and Noble Gases.
[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER – Emission Unit ID# SAT1)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Victory Energy	2. Model No. JVE 12796 Serial No. 12796
3. Number of units: 1	4. Use: Provide steam to site operations.
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: September 2016	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 100 ×10⁶ BTU/hr	10. Peak heat input per unit: ×10⁶ BTU/hr
11. Steam produced at maximum design output: 66,100 LB/hr 375.2 psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☒ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☒ Forced ☐ Induced	16. Percent of ash retained in furnace: NA %
17. Will flyash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flyash: NA %

Stack or Vent Data

19. Inside diameter or dimensions: 4.92 by 6 ft.	20. Gas exit temperature: ~357 °F
21. Height: 24 ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 29,500 ft³/min	
24. Estimated percent of moisture: 18 %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	99,980 ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	876 $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,000 Btu/ft^3 (minimum)	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	See Emission Point Data Sheet			
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO				
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

39. How will waste material from the process and control equipment be disposed of? Not Applicable

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. NA

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? Yes

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

See Section O: Monitoring, Recordkeeping, Reporting and Testing Plans

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

Not Applicable

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

See Section O: Monitoring, Recordkeeping, Reporting and Testing Plans

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

Not Applicable

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Not Applicable

Attachment L

Emission Unit Data Sheet

(INDIRECT HEAT EXCHANGER – Emission Unit ID# SH1)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Victory Energy	2. Model No. JVE 13334 Serial No. 13334-1
3. Number of units: 1 (North Boiler)	4. Use: Provide steam to site operations
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: October 2016	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 100 ×10⁶ BTU/hr	10. Peak heat input per unit: ×10⁶ BTU/hr
11. Steam produced at maximum design output: 71,800 LB/hr 453.3 psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☒ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☒ Forced ☐ Induced	16. Percent of ash retained in furnace: NA %
17. Will flyash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flyash: NA %

Stack or Vent Data

19. Inside diameter or dimensions: 4.92 by 6 ft.	20. Gas exit temperature: ~357 °F
21. Height: 24 ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 29,500 ft³/min	
24. Estimated percent of moisture: 17 %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	99,980 ft³/hr	ft³/hr	TPH	
	Annually	×10³ gal	876 ×10⁶ ft³/yr	×10⁶ ft³/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft³	gr/100 ft³	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,000 Btu/ft³ (minimum)	BTU/ft³	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	See Emission Point Data Sheet			
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO				
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

39. How will waste material from the process and control equipment be disposed of? Not Applicable

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. NA

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? Yes

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

See Section O: Monitoring, Recordkeeping, Reporting and Testing Plans

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

Not Applicable

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

See Section O: Monitoring, Recordkeeping, Reporting and Testing Plans

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

Not Applicable

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Not applicable

Attachment L

Emission Unit Data Sheet

(INDIRECT HEAT EXCHANGER – Emission Unit ID# SH2)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Victory Energy	2. Model No. JVE 13334 Serial No. 13334-2
3. Number of units: 1 (South Boiler)	4. Use: Provide steam to site operations.
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: September 2016	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 100 ×10⁶ BTU/hr	10. Peak heat input per unit: ×10⁶ BTU/hr
11. Steam produced at maximum design output: 71,800 LB/hr 453.3 psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☒ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☒ Forced ☐ Induced	16. Percent of ash retained in furnace: NA %
17. Will flyash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flyash: NA %

Stack or Vent Data

19. Inside diameter or dimensions: 4.92 by 6 ft.	20. Gas exit temperature: ~357 °F
21. Height: 24 ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 29,500 ft³/min	
24. Estimated percent of moisture: 18 %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	99,980 ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	876 $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,000 Btu/ft^3 (minimum)	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	See Emission Point Data Sheet			
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO				
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

39. How will waste material from the process and control equipment be disposed of? Not Applicable

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. NA

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? Yes

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

See Section O: Monitoring, Recordkeeping, Reporting and Testing Plans

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

Not Applicable

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

See Section O: Monitoring, Recordkeeping, Reporting and Testing Plans

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

Not Applicable

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M

Air Pollution Control Device Sheets

Not applicable

Union Carbide Corporation Institute Facility
Regulation 13 Permit Modification Application: Indirect Heat Exchangers
Attachment N: Supporting Emission Calculations

Potential emissions of regulated pollutants were calculated using USEPA Emission Factors for industrial boilers burning natural gas (AP-42) or based on vendor performance guarantees (VS). The following table summarizes the emission factors used in emission calculations.

Regulated Pollutant	Emission Factor	Source
Carbon Monoxide	0.0369 lbs/MMBtu	VS
Nitrogen Oxides	0.0364 lbs/MMBtu	VS
$PM/PM_{10}/PM_{2.5}$	6.18 lbs/mmSCF of fuel	AP-42
Sulfur Dioxide	0.588 lbs/mmSCF	AP-42
Volatile Organic Compounds	5.39 lbs/mmSCF	AP-42

Greenhouse Gases		
Chemical Compounds	Emission Factor	Source
Carbon Dioxide Methane Nitrous Oxide	117,647 lbs/mmSCF 2.25 lbs/mmSCF 0.627 lbs/mmSCF	GHGR/AP-42

AP-42 emission factor adjusted for minimum heating value of 1,000 btu/scf of natural gas.

Union Carbide Corporation Institute Facility
Regulation 13 Permit Modification Application: Temporary Natural Gas Boilers
Attachment N: Supporting Calculations

Emissions Summary Table

Pollutant Name	**Emission Rate (lbs/hr/boiler)**	Emissions (3 boilers) @ 21,674 hours of operation (tons)
Carbon Monoxide	3.69	40.0
Nitrogen Oxides	3.64	39.5
Particulate Matter	0.62	6.7
Sulfur Dioxide	0.06	0.6
Volatile Organic Compounds	0.54	5.8
Carbon Dioxide	11,762	127,469
Methane	0.23	2.4
Nitrous Oxide	0.06	0.7

Union Carbide Corporation Institute Facility
Regulation 13 Permit Modification Application: Temporary Natural Gas Boilers
Attachment N: Supporting Calculations

Temporary Boiler Emission Calculations

Carbon Monoxide (CO)		
Emission Factor	0.0369	lbs/mmBtu heat input @ 3% O_2 dry basis
Boiler Maximum Design Heat Input	99.98	mmBtus/hr
Maximum Hourly Emission Rate, One Boiler	3.69	lbs/hr/boiler
Maximum Hourly Emission Rate, Three Boilers	11.07	lbs/hr
Proposed Maximum Operating Hours, Three Boilers	21,674	hrs/yr
Maximum Annual Emissions, Three Boilers	40.0	tons

Nitrogen Oxides (NOx)		
Emission Factor	0.0364	lbs/mmBtu heat input @ 3% O_2 dry basis
Boiler Maximum Design Heat Input	99.98	mmBtus/hr
Maximum Hourly Emission Rate, One Boiler	3.64	lbs/hr/boiler
Maximum Hourly Emission Rate, Three Boilers	10.93	lbs/hr
Proposed Maximum Operating Hours, Three Boilers	21,674	hrs/yr
Maximum Annual Emissions, Three Boilers	39.5	tons

Union Carbide Corporation Institute Facility
Regulation 13 Permit Modification Application: Natural Gas Boilers

Attachment N: Supporting Calculations

Temporary Boiler Emission Calculations

Calculation of PM Emissions based on natural gas contract Btu and AP-42 factors			
AP-42 EF based on 1,020 Btu/scf			
AP-42 E.F. Particulate or TSP PM-10, PM-2.5 Filterable			
PM-10, PM-2.5 Filterable	1.86	lb/MM cu ft.	converted to 1,000 btu/scf
AP-42 E.F. Particulate or TSP PM-10, PM-2.5 Condensibles	4.31	lb/MM cu ft.	converted to 1,000 btu/scf
Total PM: Filterable Plus Condensible	6.18	lb/MM cu ft.	
Minimum Btu content	1,000	btu/cu ft.	
Boiler MDHI	99.98	MMBtu/hr	
Calculated total PM emissions based on AP-42			0.62 lb/hr/boiler
For Three Boilers 21,674 hours operation =			6.7 tons

Calculation of SO2 Emissions based on natural gas contract Btu content and AP-42 factors			
AP-42 EF based on 1,020 Btu/scf	0.6	lbs/MM cu. ft.	
Prorated AP-42 E.F.	0.588	lb/MM cu ft.	converted to 1,000 btu/scf
Minimum Btu content	1,000	btu/cu ft.	
Boiler MDHI	99.98	MMBtu/hr	
Calculated S02 emissions based on AP-42			0.06 lb/hr/boiler
For Three Boilers @ 21,674 hours operation =			0.6 tons

Calculation of VOC Emissions based on natural gas contract Btu content and AP-42 factors			
AP-42 EF based on 1,020 Btu/scf			
AP-42 E.F.	5.39	lb/MM cu ft.	converted to 1,000 btu/scf
Minimum Btu content	1,000	btu/cu ft.	
Boiler MDHI	99.98	MMBtu/hr	
Calculated VOC emissions based on AP-42			0.54 lb/hr/boiler
For Three Boilers @ 21,674 hours operation =			5.8 tons

Attachment N: Supporting Calculations

Calculation of Carbon Dioxide Emissions based on natural gas contract Btu content and AP-42 factors			
AP-42 EF based on 1,020 Btu/scf			
AP-42 E.F.	117,647	lb/MM cu ft.	converted to 1,000 btu/scf
Minimum Btu content	1,000	btu/cu ft.	
Boiler MDHI	99.98	MMBtu/hr	
Calculated CO2 emissions based on AP-42			11,762 lb/hr/boiler
For Three Boilers @ 21,674 hours operation =			127,469 tons

Calculation of Methane Emissions based on natural gas contract Btu content and AP-42 factors			
AP-42 EF based on 1,020 Btu/scf			
AP-42 E.F.	2.25	lb/MM cu ft.	converted to 1,000 btu/scf
Minimum Btu content	1,000	btu/cu ft.	
Boiler MDHI	99.98	MMBtu/hr	
Calculated methane emissions based on AP-42			0.23 lb/hr/boiler
For Three Boilers @ 21,674 hours operation =			2.4 tons

Calculation of Nitrous Oxide Emissions based on natural gas contract Btu content and AP-42 factors			
AP-42 EF based on 1,020 Btu/scf			
AP-42 E.F.	0.627	lb/MM cu ft.	converted to 1,000 btu/scf
Minimum Btu content	1,000	btu/cu ft.	
Boiler MDHI	99.98	MMBtu/hr	
Calculated nitrous oxide emissions based on AP-42			0.06 lb/hr/boiler
For Three Boilers @ 21,674 hours operation =			0.68 tons

Estimated Fugitive Emissions

BASIS: Estimate fugitive emissions from fuel gas (natural gas only) lines using the following emission factors for the Oil and Gas Industry. These emissions factors where derived to include methane.

Component	Wt. Fr.
Methane	0.6058
Ethane	0.1893
Propane	0.1073
i-Butane	0.0140
n-Butane	0.0356
i-Pentane	0.0104
n-Pentane	0.0094
n-Hexane	0.0066
n-Heptane	0.0058
n-Octane	0.0028
Nitrogen	0.0096
Carbon Dioxide	0.0034
total	1.0000

CALCULATION OF FUGITIVE EMISSIONS FROM NATURAL GAS EQUIPMENT COMPONENTS								
Natural Gas Factors			Volatile Organic Compounds		Hexane		Methane	
Component	Number of Components	Emission Factor	lbs/hr	Emission Rate (tons/yr)	lbs/hr	Emission Rate (tons/yr)	lbs/hr	Emission Rate (tons/yr)
Valves	31	0.0099	0.05890	0.26	0.00	0.009	0.19	0.81
Pump Seals								
Non-flanged connectors								
Flanges	148	0.00086	0.02443	0.11	0.00	0.004	0.08	0.34
Open-ended lines								
Connectors	186	0.00044	0.01571	0.07	0.00	0.002	0.05	0.22
TOTAL FOR CHEMICAL			0.10	0.43	0.00	0.02	0.31	1.37

ATTACHMENT O: Monitoring, Recordkeeping, Reporting and Testing Plans

Certified flow meters will be used to measure the natural gas flow-rate to each boiler. Records of fuel consumption will be used to calculate emissions.

A monthly record of the amount of natural gas burned in each boiler will be maintained. Emissions of nitrogen oxides will be calculated from fuel consumption and the manufacturer's guarantee for nitrogen oxides (0.0364 lbs/mmBtu heat input). A 12-month rolling total of emissions of nitrogen oxides from the combined three boilers will be maintained to show that annual nitrogen oxide emissions do not exceed 39.5 tons

Pollutant Name	Emission Rate (lbs/hr/boiler)	Annual Emissions (3 boilers) (tons)
Carbon Monoxide	3.69	40.0
Nitrogen Oxides	3.64	39.5
Particulate Matter	0.62	6.7
Sulfur Dioxide	0.06	0.6
Volatile Organic Compounds	0.54	5.8

Attachment P

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Union Carbide Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality (WVDAQ), for a permit to construct and operate three small natural gas fueled steam generating boilers at the Institute Facility located on State Route 25, at Institute, in Kanawha County, West Virginia. The latitude and longitude coordinates are: 38.384 and -81.776, respectively.

The boilers have the potential to discharge the following regulated air pollutants in tons per year. Carbon monoxide – 40, Nitrogen oxides – 39.5, Particulate matter – 6.7, Sulfur dioxide – 0.6, and Volatile Organic Compounds 5.8. The boilers commenced operation the second week of October 2016.

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding the permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.
Dated this the (Day) day of (Month), (Year).

By: Union Carbide Corporation
Jon W. Putnam
WVO Responsible Care Leader
P.O. Box 8361
South Charleston, WV 25303

Attachment Q

Business Confidentiality Claims

Not Applicable

ATTACHMENT R

Union Carbide Corporation
A Subsidiary of The Dow Chemical Company

February 22, 2016

RE: DELEGATION OF AUTHORITY

I delegate to the following individual the authority to sign and execute documents on behalf of Union Carbide Corporation (the "Company") in the areas identified below associated with West Virginia Operations.

Name: Jon W. Putnam
Position: Responsible Care Leader
Facilities: South Charleston Manufacturing Plant
437 MacCorkle Avenue, SW, South Charleston, WV 25303
South Charleston Technology Park
3200/3300 Kanawha Turnpike, South Charleston, WV 25303
Institute Manufacturing Site
Route 25, Institute, WV 25112

To the fullest extent permitted by law, this delegation includes the authority to sign all reports and permit applications under regulations implementing federal, state, or local environmental, health and safety laws and regulations, and to provide, where appropriate, other relevant information requested by the Administrator of the U.S. EPA or other federal, state or local environmental, health and safety agencies. Any environmental, health and safety documents signed or executed by Jon W. Putnam shall have the same force and effect, and shall bind Union Carbide Corporation, as if done by me. Without limiting the generality of the foregoing, I am an authorized signatory for the Company as defined in 40 CFR 98.4, 40 CFR 122.22, 40 CFR 144.32, and 40 CFR 270.11, and a Responsible Official as defined in 40 CFR 70.2.

I explicitly stipulate that the individual named above is restricted to re-delegating any authority granted by this Delegation unless that delegation is executed in writing and the re-delegation is approved by the Law Department as meeting requirements of the environmental regulations referenced in the paragraph above.

This Delegation shall remain in effect until rescinded or modified by me or my successor, in writing, and shall expire on August 31, 2019. This Delegation supersedes and replaces any prior delegations.

02/23/16
Date

Jason P. Lankford
Vice President

STATE OF LOUISIANA)
) ss.
PARISH OF ST. CHARLES)

The foregoing instrument was acknowledged before me this 23rd day of February, 2016, by Jason P. Lankford, Vice President of Union Carbide Corporation, a New York corporation, on behalf of the corporation.

Notary Public

My commission expires

Donald L. Lichenstein III
Notary Public
State of Louisiana
Notary ID # 131940
My Commission is for Life

ATTACHMENT R

Union Carbide Corporation
A Subsidiary of The Dow Chemical Company
P.O. Box 8004
437 MacCorkle Avenue, SW
South Charleston, WV 25303
USA

AUTHORITY OF CORPORATION

TO: The West Virginia Department of Environmental Protection,
Division of Air Quality

DATE: March 1, 2016

ATTN: Mr. William F. Durham, Director

Corporation's Federal Employer I.D. Number 13-1421730

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which is used in the conduct of an incorporated business.

Further, the corporation entity certifies as follows:

(1) Jon W. Putnam is the authorized representative and in that capacity may represent the interest of the corporation and may obligate and legally bind the corporation.

(2) The corporation is authorized to do business in the State of West Virginia.

(3) If the corporation changes its authorized representative, the corporation shall notify the Director of the West Virginia Department of Environmental Protection, Division of Air Quality, immediately upon such change.

Jason P. Lankford
Vice President
Union Carbide Corporation
A Subsidiary of The Dow Chemical Company

Attachment S

Title V Permit Revision Information

Not Applicable

Attachment T

Application Fee